Installation and Operations Manual

Claritech RT-1

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1. Introduction

Claritech RT-1 is a specialized device used for remote monitoring and control of mains and UPS power supply using SNMP. The unit monitors the voltage of mains supply alerting the network operations centre about power failures and enabling a fast reaction. RT-1 also enables the user to control a power outlet remotely.

1.1 Product Description

The unit is designed to be used on sites where an Uninterruptible Power Supply unit is present. One output from the UPS should supply the RT-1 device. In this way the unit can send SNMP traps if the mains power supply is down because the UPS still provides back-up power.

RT-1 has an IEC C13 10A socket output that can be switched via an internal relay. This output allows a network manager to power off, power on and reboot network devices from any location via web interface or SNMP. Using Claritech RT-1 one can quickly restart locked-up remote servers & router devices to ensure that the network is fully operational around the clock.

RT-1 has also an IEC C13 socket input for connecting AC mains to it in order to report the instant mains AC voltage RMS value.

Using an SNMP manager it is possible to evaluate the capacity of the UPS back-up battery by comparing the time interval between mains power failure and UPS failure. By charting the incidence and frequency of power failures it is possible to evaluate the correct UPS back-up dimensioning. Also, instant mains AC voltage RMS value is reported, useful for investigating poor mains supply cases.

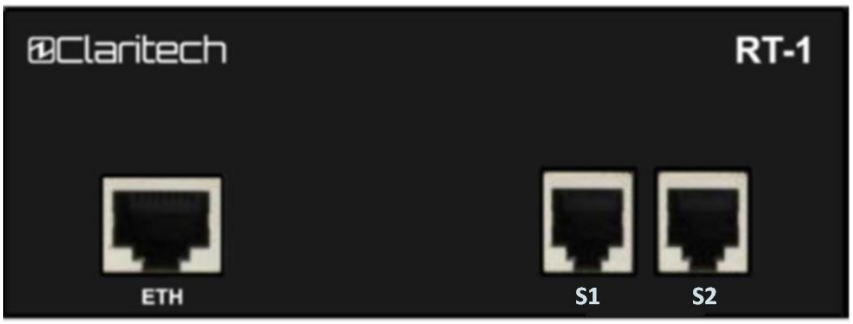
RT-1 also has one “dry-contact” input. Optionally, one external temperature, temperature/ humidity sensor can be connected to the sensor port located on the back panel. RT-1 reports temperature and relative humidity values using SNMP.

1.2 Features

- 10 Mbps Ethernet connectivity, DHCP/Static IP
- NTP synchronization
- Password protected access
- Web based configuration and control
- Mains AC Voltage reporting
- 1 ‘dry-contact’ input (NC/NO)
- 1 switched power output
- 1 input for optional digital temperature or temperature and humidity sensor
- SNMP v.1 traps for alarm conditions
- E-mail notification based on alarm conditions
- Customizable HTTP and SNMP ports
- HTTP and XML API commands
- Remote FTP firmware update

2. Ports and Wiring

FRONT



On the **Front** the device has the following ports:

• **ETH** – RJ45 connector - for connecting the device to the LAN
• **SENSOR PORT S1** – 1 x RJ11 connector - for connecting the additional Temperature/Humidity Sensor.
• **SENSOR PORT S2** – 1 x RJ11 connector - for connecting the additional Dry Contact Closure Sensor.

BACK

On the **Back** the device has the following ports:

• **220V AC IN** – IEC C13 male connector – used as AC input for mains voltage measurement.
• **RELAY OUT -** IEC C13 female connector – used as software switched AC output, having 220V AC power supply from UPS.
• **220V AC FROM UPS** – wire – used as power supply connection - 220V AC - for the RT-1 device and also as power supply for the RELAY OUT port. This wire should be connected to an UPS output in order for the device to work in case of a mains failure.

3. Configuration of the RT-1 device

The device can be configured by using the ETH port:

1. Connect the RT-1 device to a 10/100MB Ethernet network.
   If a direct connection to a PC is desired, then a crossover Ethernet cable must be used.
   If the device is connected to a switch/router, then a straight Ethernet cable must be used.
2. Connect any additional sensors to the RJ11 ports, if needed.
3. Connect the 220V AC IN and RELAY OUT cables to the corresponding ports, if needed.
4. Connect the power supply to the 220V AC FROM UPS port.

After connecting the power supply, the RT-1 device will boot up.
The **factory default IP settings of the RT-1 device** are as follows:

IP address:	192.168.1.2
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.1.1

In order to connect a PC to the RT-1 device, a temporary IP address should be assigned to the computer. The address should be in the same network. For example:

PC IP address:	192.168.1.3
PC Subnet Mask:	255.255.255.0
PC Default Gateway:	192.168.1.2

3.1 Web Interface – Logging into the device

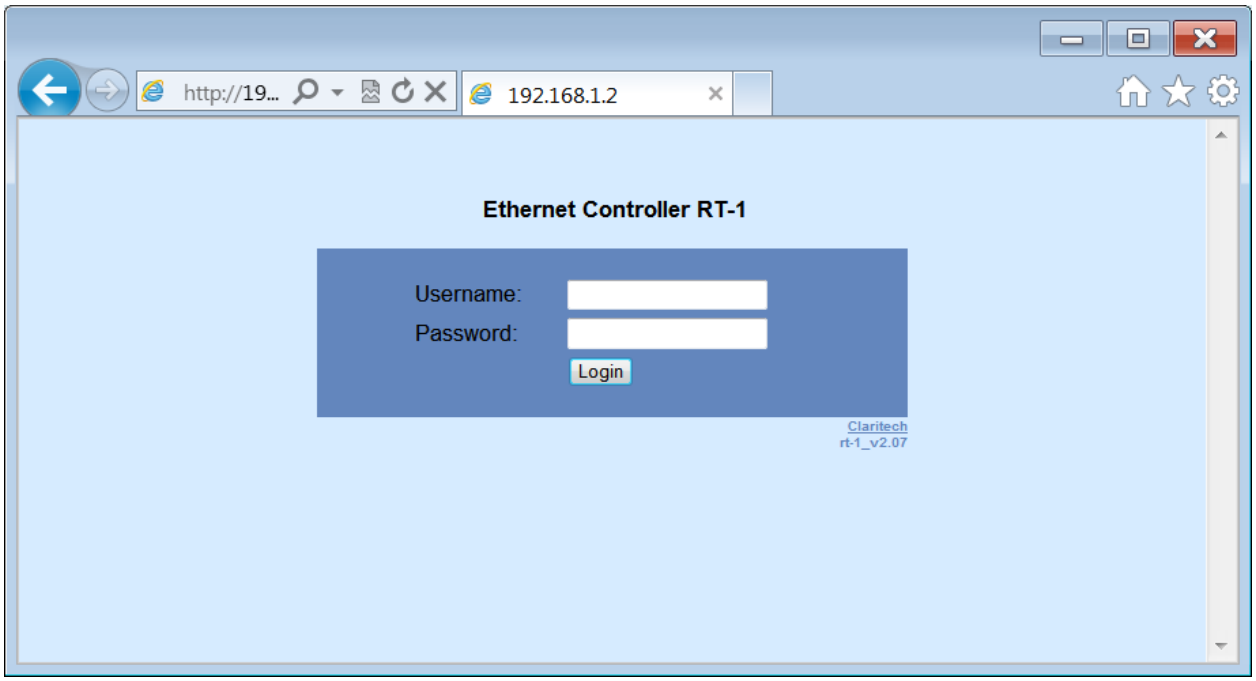
The RT-1 device can be easily configured using the Web Interface. After configuring the above IP settings, one should type http://192.168.1.2 in the internet browser address field in order to access the Web Interface.

If the network settings are correct, then the *"Login" Page* will load.

In the *"Login" Page*, the security/authorization data must be entered in order to further configure the device.

The **factory default username and password** of the RT-1 device are:

Default username:	*admin*
Default password:	*admin*

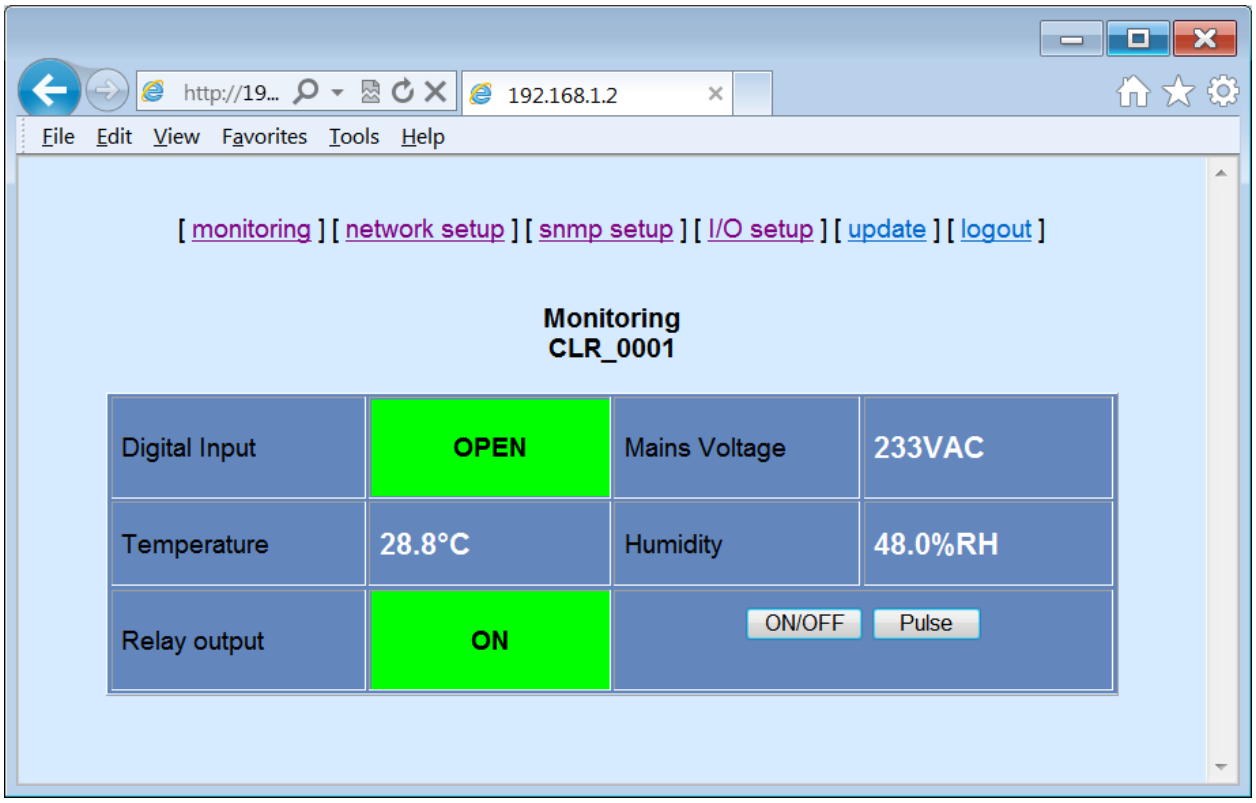


"Login" Page

The controller supports one active session – only one user can operate the device. If another user tries to login, the message "Someone's logged in" appears. The active session will be terminated automatically, if the current user stays inactive for 2 minutes.

3.2 Monitoring Page

After successfully logging in, the Monitoring page loads in the browser.



Monitoring Page

It can be noticed that at the top of the Monitoring Page there is a navigation bar. This bar is present in all the other pages of the device Web Interface, in order to facilitate an easy navigation.

The Monitoring Page provides information about the status of the RT-1 device:

• **Digital Input**: It refers to the 'dry-contact' input of the device. The status can be: *Open* (open circuit) or *Closed* (short).

• **Temperature**: If the additional temperature sensor is attached to the RT-1 device, this field shows the temperature in °C.

• **Relay output**: It shows the state of the relay which controls the *RELAY OUT* AC port located on the back of the device. The values of this field can be: *ON* or *OFF.*

• **ON/OFF button**: This button can be used to manually turn on/off the above relay.

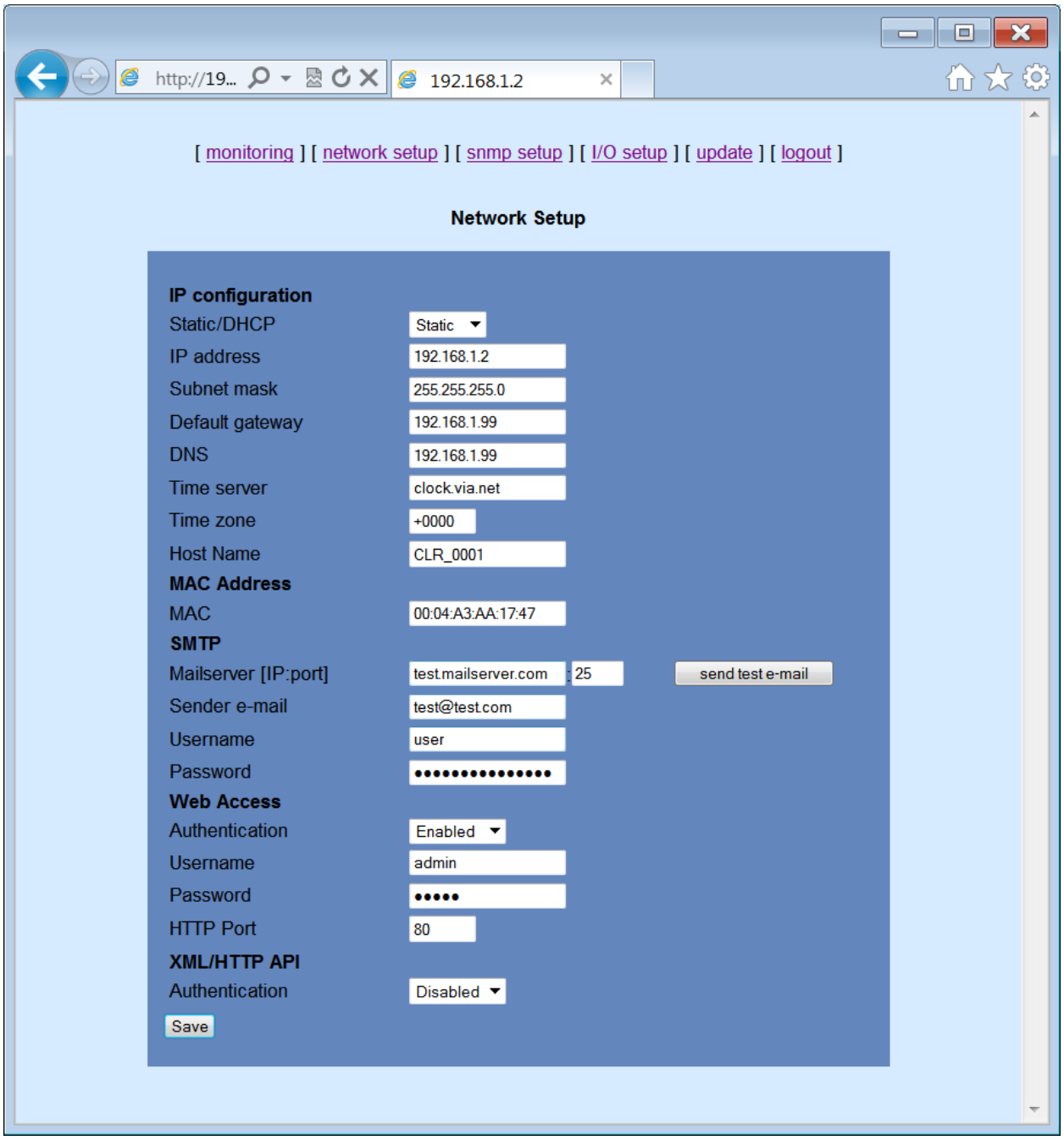
• **Pulse button**: This button can be used to manually turn on/off the Pulse mode of the relay. Other settings of the Pulse mode can be configured in the *I/O Setup* page of the RT-1 device.

• **Mains Voltage**: This field shows the value in VAC of the mains power supply connected to the 220V AC IN port of the device.

• **Humidity**: If the additional temperature/ humidity sensor is installed, this field shows the air relative humidity in percents.

3.3 Network Setup Page

This page is used for configuring the network parameters of the RT-1 device.



Network Setup Page

IP configuration parameters:

• **Static/DHCP** – The IP Address can be static or dynamic (DHCP server should be present in the network);

• **IP address, Subnet mask, Default gateway** – these fields are active if the IP address is static and they are used for changing the device IP network settings;

• **DNS** – this field is mandatory, if domain names are used instead of IP addresses. By default DNS has the same IP address as Default gateway;

• **Time Server** and **Time Zone** – these fields are used when an e-mail is sent in order to get the accurate time. A NTP (Network time protocol) server IP address should be added in this field;

• **Host Name** – up to 16 symbols, it appears as a "Subject" in sent e-mails;

• **MAC** – device MAC address

SMTP parameters:

• **Mailserver [IP:port]** – domain or IP address + port of SMTP mail server. In order to use domain name, the IP address in DNS field must be correct**.** SSL **(**Secure Socket Layer) is not supported on the mail server.

• **E-mail** – sender e-mail;

• **Username** and **Password** – authentication details for mail server**.**

Web Access parameters:

• **Authentication:** this field is used for enabling/ disabling the authentication for the Web Interface.

• **Username** and **Password** – authentication details for the Web Interface**.**

• **XML/HTTP API Authentication** – this field is used for enabling/ disabling the authentication for the XML/HTTP API.

3.4 SNMP Setup Page

The Claritech RT-1 device supports SNMP version 1. Parameter values can be read /written using the SNMP OIDs (see chapter 5 OID List). The device can also send traps to a SNMP management application. SNMP traps are sent by the device if:

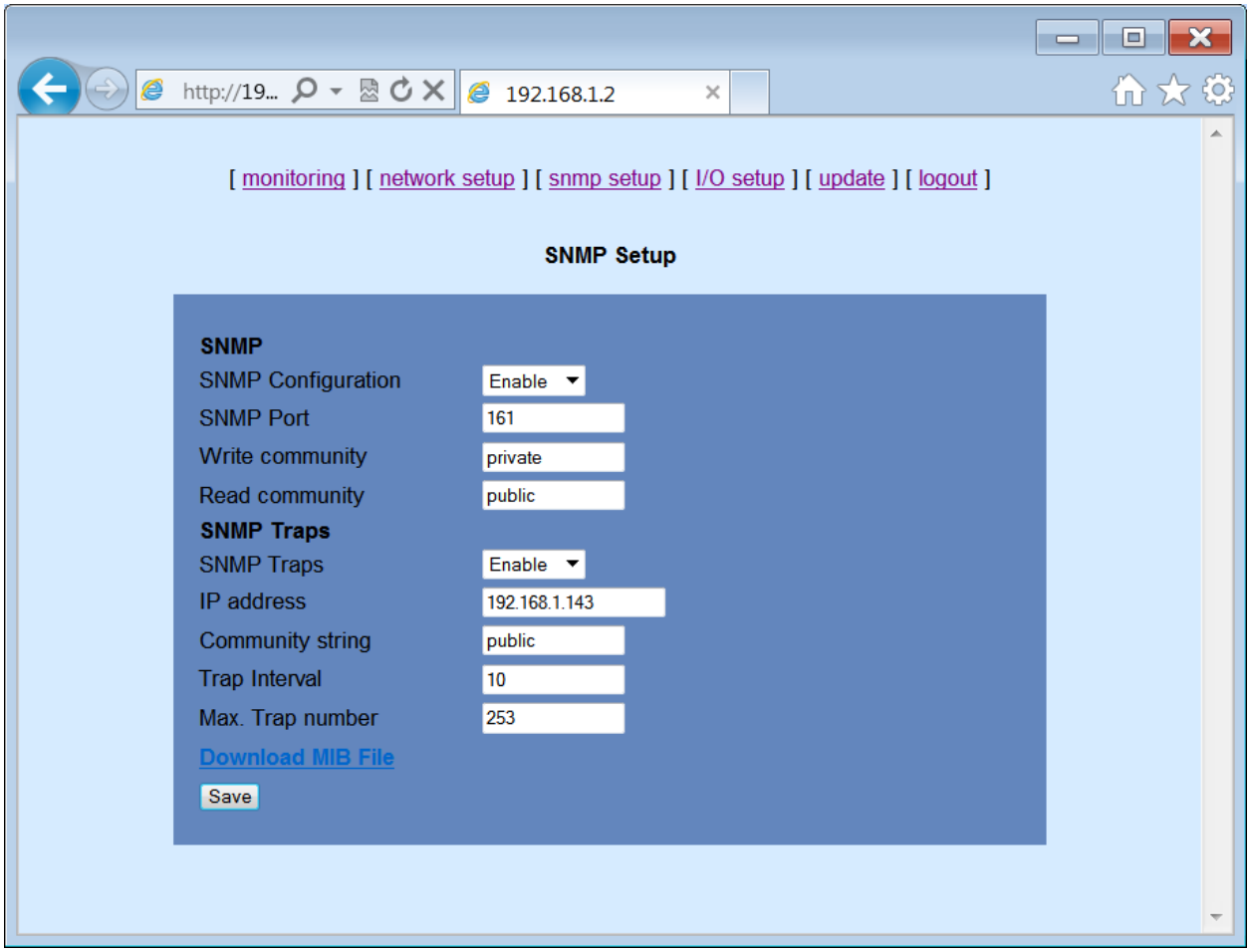
• an event occurs (status change) on the 'dry contact' input;

• the measured voltage on 220V AC IN port goes outside the configured range;

• the measured temperature goes outside the configured range;

• the measured humidity goes outside the configured range;

• restart condition



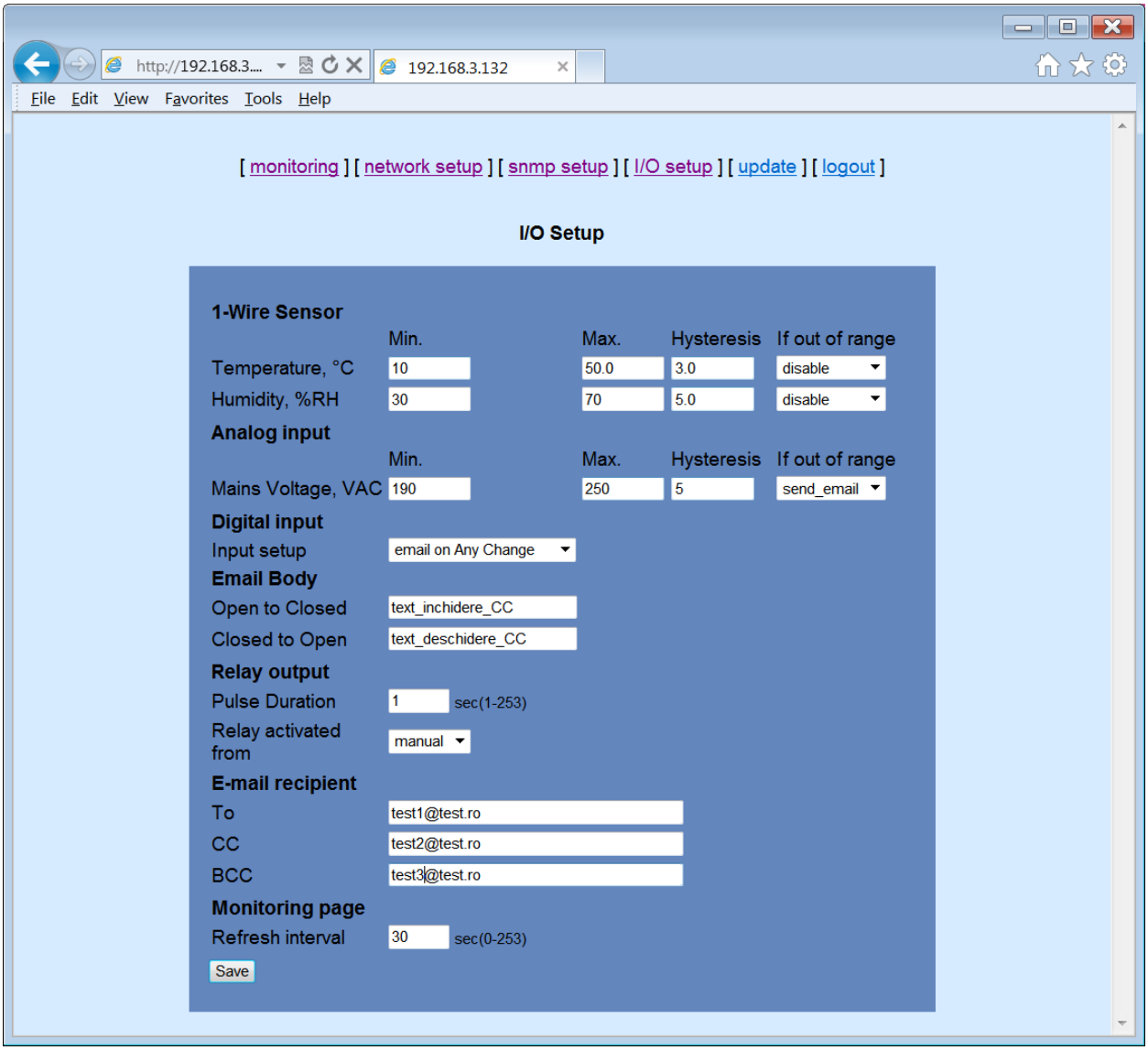
SNMP Setup Page

The following SNMP parameters can be configured in this page:

- **SNMP Configuration** – enables/disables SNMP;
- **SNMP Port** – allows standard port changing;
- **Write/Read community** – used for client authentication in SNMP v1 standard;
- **SNMP Traps** – enables/disables SNMP trap messages;
- **IP address** – IP address of the receiving host for SNMP traps;
- **Community string** – used for client authentication in SNMP v1 standard;
- **Trap Interval** - time interval in seconds for re-sending the SNMP trap messages if the condition for sending the traps is still present;
- **Max. Traps number** – maximum number of SNMP trap messages sent, if trap condition is present.
- **Download MIB File button** – It can be used in order to download the SNMP MIB file of the Claritech RT-1 device.

3.5 I/O Setup Page

This page is used for setting the parameters of the temperature sensor, humidity sensor, mains AC voltage sensor and ‘dry-contact’ input.


http://192.168.3....
192.168.3.132
File Edit View Favorites Tools Help
[monitoring] [network setup] [snmp setup] [I/O setup] [update] [logout]
I/O Setup
1-Wire Sensor
Min. Max. Hysteresis If out of range
Temperature, °C 10 50.0 3.0 disable
Humidity, %RH 30 70 5.0 disable
Analog input
Min. Max. Hysteresis If out of range
Mains Voltage, VAC 190 250 5 send_email
Digital input
Input setup email on Any Change
Email Body
Open to Closed text_inchidere_CC
Closed to Open text_deschidere_CC
Relay output
Pulse Duration 1 sec(1-253)
Relay activated from manual
E-mail recipient
To test1@test.ro
CC test2@test.ro
BCC test3@test.ro
Monitoring page
Refresh interval 30 sec(0-253)
Save

I/O Setup Page

• **Temperature, Humidity and Mains Voltage fields**: For these parameters *Min. ,Max. and Hysteresis* values can be set.

Every time the read value coming from this sensors goes out of range, an e-mail is generated (if enabled), with appropriate “Subject” and “Message”. Leaving range is considered when the parameter goes lower than MIN values or higher than MAX. Coming back in the range is consider when the parameter goes lower than (MAX – HISTERESYS) or higher than (MIN + HISTERESYS).

• **Digital Input – Input Setup**: This filed is used for enabling/ disabling the ‘dry-contact’ input conditional notifications.

• **Email Body – Open to Closed, Closed to Open**: These fields should be filled with the notification text sent upon a change of state of the contact closure.

• **Relay output – Pulse duration**: This filed defines the time length, in seconds, for which the relay is active, when the pulse mode is used.

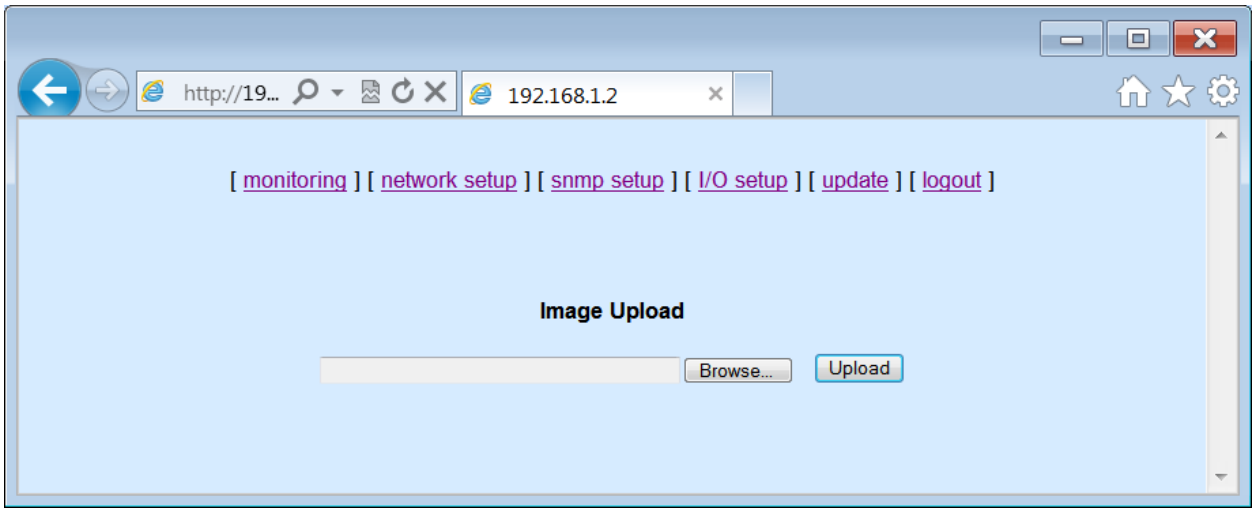
• **Relay output – Relay activated from**: This field defines the way the relay is activated. The relay can be activated automatically depending on the value of the monitored parameter (humidity, temperature, analog voltage and changes on digital input) or it can be activated manually. Only one parameter can be assigned for relay activation, at the same time. When manual activation is selected, “Pulse” and “ON/OFF” buttons on “Monitoring page” are active. The duration of pulse for relay activation can be set from 1 to 253 seconds.

• **E-mail recipients TO,CC,BCC**: These fields should be filled in with the e-mail addresses where all the e-mail notifications will be sent.

• **Monitoring page refresh interval**: This is the amount of time, in seconds, after which the *Monitoring Page* will refresh itself. If value 0 will be filled, then there will be no automatic refresh of the *Monitoring Page*.

3.6 Firmware Update page and Logout

This page is used for updating the device firmware:



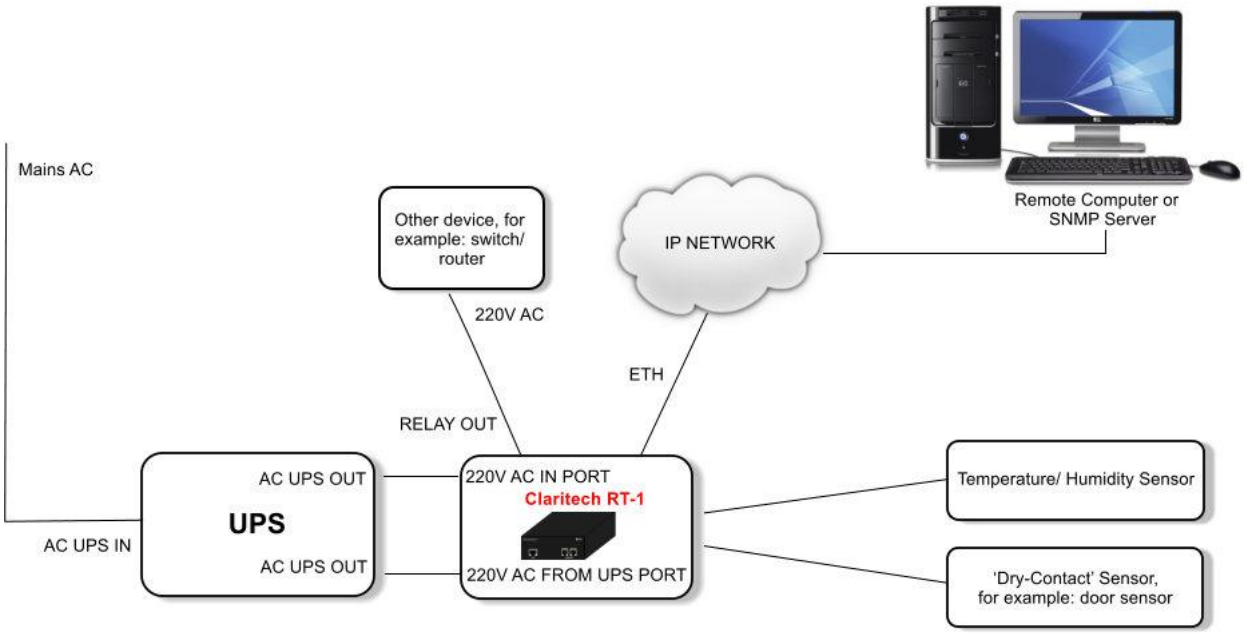
Firmware Update Page

Further information on how to update the device will be included in the new firmware releases.

The ***Logout button*** from the top navigation bar can be used to logout after the desired settings of the device have been applied.

4. Application example

The below example shows one of the ways the Claritech RT-1 device can be used:



Example of Claritech RT-1 device usage

In this example, the RT-1 device is powered from an UPS unit. The *220V AC IN port* of the RT-1 device is connected to the mains supply in order to facilitate the measurement of the mains voltage. Another device (for example switch or router) is connected to the *RELAY OUT port* of the RT-1 unit. This way this device can be turned on/off or rebooted remotely.
RT-1 is connected to the IP network using the *ETH port*.
Additional sensors can be added to the RT-1 device by connecting them to the *SENSORS ports*. The additional devices can be: temperature sensor, temperature/humidity sensor and any 'dry-contact' sensor.

5. OID List

The Claritech RT-1 device can be configured and monitored through SNMP (Simple Network Management Protocol). This could be done using every SNMPv.1 compatible program. Parameters that can be changed, are grouped according to their functions in the tables below. To obtain a valid OID number it is necessary to replace "**x**" symbol with "**1.3.6.1.4.1.38783"**. To save the changes **configurationSaved** (OID x.3.7.0) should be set to "1".

5.1 Product

OID	Name	Access	Description	Syntax
x.1.1.0	name	read-only	Device name	String
x.1.2.0	version	read-only	Firmware version	String
x.1.3.0	date	read-only	Firmware release date	String

5.2 Setup

network				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.1.1.0	deviceIPAddress	read-write	Device IP address	IpAddress
x.2.1.2.0	subnetMask	read-write	Subnet Mask	IpAddress
x.2.1.3.0	gateway	read-write	Gateway IP address	IpAddress
x.2.1.4.0	deviceMACAddress	read-write	Device MAC address	OCTET STRING (SIZE(6))
x.2.1.5.0	dhcpConfig	read-write	DHCP configuration ON/OFF	INTEGER { off(0), on(1) }
x.2.1.6.0	dns	read-write	Domain Name Server Address	IpAddress
x.2.1.7.0	hostName	read-write	Host Name	String (SIZE (0..38))

SNMP				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.4.1.0	snmpConfiguration	read-write	SNMP Configuration ENABLED/DISABLED	INTEGER { disabled(0), enabled(1) }
x. 2.4.2.0	trapEnabled	read-write	Indicates if this trap entry is enabled or not	INTEGER { no(0), yes(1) }
x. 2.4.3.0	trapReceiverIPAddress	read-write	Trap receiver IP address	IpAddress
x. 2.4.4.0	trapCommunity	read-write	Trap community	String (SIZE (0..13))
x.2.4.5.0	trapInterval	read-write	Trap Interval	INTEGER (1..253)
x.2.4.6.0	maxNumberOfTraps	read-write	Max Number of Traps	INTEGER (1..253)

oneWireSensor -> temperature				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.5.1.1.0	temperatureMin	read-write	Temperature minimum value	INTEGER (-400..1250)
x.2.5.1.2.0	temperatureMax	read-write	Temperature maximum value	INTEGER (-400..1250)
x.2.5.1.3.0	temperatureHyst	read-write	Temperature hysteresis	INTEGER (0..1250)
x.2.5.1.4.0	temperatureAction	read-write	Temperature Action	INTEGER { noAction(0), sendMail(1) }

oneWireSensor -> humidity				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.5.2.1.0	humidityMin	read-write	Humidity minimum value	INTEGER (0..1000)
x.2.5.2.2.0	humidityMax	read-write	Humidity maximum value	INTEGER (0..1000)
x.2.5.2.3.0	humidityHyst	read-write	Humidity hysteresis	INTEGER (0..1000)
x.2.5.2.4.0	humidityAction	read-write	Humidity Action	INTEGER { noAction(0), sendMail(1) }

analogInput				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.6.1.0	voltageMin	read-write	Voltage minimum value	INTEGER (0..1000)
x.2.6.2.0	voltageMax	read-write	Voltage maximum value	INTEGER (0..1000)
x.2.6.3.0	voltageHyst	read-write	Voltage hysteresis	INTEGER (0..1000)
x.2.6.4.0	voltageAction	read-write	Voltage Action	INTEGER { noAction(0), sendMail(1) }

digitalInput				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.7.1.0	digitalInputAction	read-write	Digital Input Action	INTEGER { noAction(0), mailIfOpenToClosed(1), mailIfClosedToOpen(2) }

Relay				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.8.1.0	relayControl	read-write	Relay Control Item	INTEGER { manual(0), temperature(1), humidity(2), analogInput(3), digitalInput(4) }
x.2.8.2.0	relayPulseWidth	read-write	Relay Pulse Width	INTEGER (1..253)

recipients				
OID	**Name**	**Access**	**Description**	**Syntax**
x.2.9.1.0	recipientEmailAddress	read-write	recipient e-mail address	String (SIZE (0..38))

5.3 Monitor and control

OID	Name	Access	Description	Syntax
x.3.1.0	digitalInputState	read-write	Digital Input State	INTEGER { closed(0), open(1) }
x.3.2.0	relayState	read-write	Relay State	INTEGER { off(0), on(1) }
x.3.3.0	relayPulse	read-write	Relay Pulse	INTEGER { off(0), on(1) }
x.3.4.0	voltx10Int	read-only	Voltage x10 in Integer format	INTEGER (0..1000)
x.3.5.0	tempx10Int	read-only	Temperature x10 in Integer format	INTEGER (-400..1250)
x.3.6.0	humix10Int	read-only	Humidity x10 in Integer format	INTEGER (0..1000)
x.3.7.0	configurationSaved	read-write	Configuration save status SAVED/UNSAVED	INTEGER { unsaved(0), saved(1) }
x.3.8.0	restartDevice	read-write	Restart Device	INTEGER { cancel(0), restart(1) }

6. XML and HTTP API Commands

XML is sometimes the preferred choice when it comes to M2M communication and system integration. The monitored values are transmitted in the **status.xml** file that can be easily processed by software applications.
Below is the structure of the XML file, which is located at:
http://your.ip.address/status.xml

<Monitor>
<Device>TCW112-CM</Device> Device Type
<FW>tcw112-cmv1.01</FW> Firmware version
<DigitalInput >OPEN</DigitalInput > Digital input state
<Relay>ON</Relay> Relay state
<AnalogInput >5.2</AnalogInput > Analog input value
<Temperature>---</Temperature > Temperature value
<Humidity>---</Humidity > Humidity value
</Monitor>

The relay can be controlled by sending HTTP commands:

Command	Description
http://your.ip.address/?r1=1	Turn Relay ON
http://your.ip.address/?r1=0	Turn Relay OFF
http://your.ip.address/?tg1=1	Toggle Relay state
http://your.ip.address/?pl1=1	Pulse relay

7. Additional sensors

The RT-1 device has 2 *Sensor Ports* on the front side.

The S1 port is used to connect the ‘T/H sensors and the S2 port is used to connect dry-contact’ sensor.

The additional sensors that can be connected to this ports are as follows:

7.1 Temperature Sensor RT-T

The **RT-T** sensor is a digital temperature sensor that provides an option for temperature monitoring. The head of the sensor is made of aluminum, allowing low thermal resistance to the controlled object.

The temperature sensor **RT-T** is delivered with 1 meter long cable.

Technical parameters

Operating range	–40 to +85	°C
Accuracy	0.5	°C
Head's dimensions	8 x 8 x 23	mm
Cable length	1	m
Weight	40	g
Communication interface	1-Wire	

7.2 Temperature/ humidity Sensor RT-TH

RT-TH is a sensor for humidity and temperature monitoring. The device integrates basic elements plus signals processing and provides a fully calibrated digital output. A unique capacitive element is used for measuring relative humidity while temperature is measured by a band gap sensor. Both sensors are seamlessly coupled to a 12 bit analog to digital converter. This results in superior signal quality and fast response time.

Technical parameters

	Humidity		**Temperature**	
Operating Range	0 to 100	%RH	-40 to +85	°C

Accuracy	± 3.0	%RH	± 0.4	°C
Resolution	0.05	%RH	0.01	°C
Long-term drift	<0.5	RH/yr	<0.04	°C/yr
Interface	1-Wire			
Cable/length	LIYY/1 m			

7.3 'Dry-Contact' Sensor

The RT-1 is capable of working with any 'Dry-Contact' sensor on the market. 'Dry-Contact' sensors can be, for example: door sensors, water leakage sensors, current flow sensors, etc.

8. Technical Specifications

Mains Input:	108-240VAC, max. 10 A
UPS Input/Output:	190-240VAC, max. 10A
Power consumption:	< 3W, relay energized
Operating temp.:	0 - 50 deg. Celsius
Humidity:	Max. 80%, non-condensing
Mounting:	Wall tabs/optional rack tray

Appendix A – Device Size